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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/742,157	12/19/2000	Naoko Iwami	16869C-016600US	9696

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TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER

ZHONG, CHAD

ART UNIT PAPER NUMBER

2152

DATE MAILED: 11/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/742,157

Applicant(s)

IWAMI ET AL.

Examiner

Chad Zhong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

OFFICE ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/19/2005 has been entered.

2. In response to amendment filed 09/19/2005, claims 23-33 are pending for examination. Examiner notes Claims 1-22 are cancelled; Claims 23, 29, and 30 are currently amended; Claims 24-28, and 31-33 are previously presented. Applicant's arguments are persuasive, and the previous rejections are removed. In addition, newly rejections cited are stated below.

3. Applicant's remarks filed 09/19/2005 have been considered but are moot in view at the new grounds of rejection necessitated by Applicant's amendment.

4. The examiner will interpret *data capacity of the storage device* as maximum resource that can be assigned (allocated) to or be service by a network component, the maximum information carrying ability of a communications facility or system.

Claim Rejections - 35 USC § 112, second paragraph

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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- a. The following terms lack antecedent basis:
 - i. the communication link - claim 27, line 3.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 23-25, 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Napolitano et al. (hereinafter Napolitano), US 6,301,605, in view of Galand et al. (hereinafter Galand), US 2004/0042402.

8. As per claim 23, Napolitano teaches a storage system substantially as claimed comprising:

a plurality of I/O ports (Col. 3, lines 55-60) for connection to a communication network, the I/O ports receiving write requests (Col. 4, lines 25-30);

an array of media for storing information (Col. 6, lines 35-45), the array comprising a plurality of disk storage units organized into a plurality of logical disks (Col. 6, lines 35-45; Col. 8, lines 35-41);

a plurality of data paths for selective connection (Col. 8, lines 23-25, wherein the efficient mapping of file system addresses to disk address reads on the selective connection; Col. 12, lines 35-47) between the logical disks and the I/O ports;

Napolitano does not explicitly teach:

an allocator to allocate the data paths between logical disks and I/O ports based upon a data rate capability of the data paths to thereby provide a desired quality of service.

Galand teaches:

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an allocator to allocate the data paths ([0094], router controller allocates data paths) between the logical disks and the I/O ports ([0082-0085], [0091-0092], the source and the destination both have storage devices and ports) based upon a data rate capability of the data paths ([0102-0106]) to thereby provide a desired quality of service.

It would have been obvious to the person of ordinary skill in the art at the time of the invention to incorporate Galand teaching with of Napolitano because the combination would improve the efficiency of Napolitano's systems by utilizing a network topology based congestion control and path selection mechanism, (Galand, [0046-0049]; [0079]).

9. As per claim 24, Napolitano - Galand disclose the invention substantially as rejected in claim 23 above, including:

the array of media includes media having different operational characteristics (Napolitano, Col. 8, lines 20-26, lines 35-42; Col. 10, lines 20-35, Col. 12, lines 40-47, wherein the logical disk configurations are made of plurality of different physical disk implementations, such different disk configurations will have an impact on the operational speed, storage space as well as capacity of the operating disks, i.e. a logical partition made of entirely of adapter cache is faster than a logical partition located on a remote RAID device, however, RAID disk arrays have larger capacity than the adapter cache; Col. 8, lines 35-45, additionally, each logical disk configuration is defined by a data containers that are superimposed on the physical disk configuration, logical configuration consists of a hierarchy of three elements: partitions, data containers and multi-level data containers, partitions are constructed from contiguous areas of free space and are thereafter associated with data containers. Since logical partitions can be 'mapped' on to different physical disk drives, each read/write access to logical partitions groups of physical disk drives involve different operational characteristics since the access commands are in fact controlling plurality of physical disks),

the storage system allocates individual ones of media (Galand, [0089], the routing points are the

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media here) to individual ones of the data paths to provide the desired quality of service (Galand, [0094], [0102-0106]).

10. As per claim 25, Napolitano - Galand disclose the invention substantially as rejected in claim 23 above, including:

a processor in the host system (Napolitano, Fig. 3, item 312) establishes a data path between the storage and the network connection (Napolitano, Fig 3, item 302);

the data path being assigned a sufficient data speed to accommodate the desired quality of service (Galand, [0102-0106], [0114-0115], [0171-0172])

11. As per claim 27, Napolitano - Galand disclose the invention substantially as rejected in claim 23 above, including:

the storage system allocates ones of the array of media based upon a data rate capability of the media (Galand, [0158], [0160-0166], [0171-0172], wherein each intermediary nodes have their own data rate capability. In event of a network congestion as caused by unanticipated burstiness, said intermediary nodes will begin to drop packets. Since the origin node is reserving bandwidth/data rate capacity of the intermediary nodes, the node will either accept or reject such a request due to above mentioned finite data rate capability) and a data rate capability of the communication link (Galand, [0105-0106]).

10. As per claim 28, Napolitano - Galand disclose the invention substantially as rejected in claim 23 above, including:

the desired quality of service comprises a specified bandwidth (Galand, [0094], [0102-0106]) and wherein the storage system allocates individual ones of the media based upon the guaranteed bandwidth (Galand, [0158], [0160-0166], [0171-0172]).

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11. As per claim 29, Napolitano teaches a storage system substantially as claimed comprising:

an array of storage media (Napolitano, Col. 8, lines 20-26);

a plurality of I/O ports, each having a network connection (Napolitano, Col. 3, lines 55-60) operable to connect to the array with a desired quality of service (Napolitano, Col. 12, lines 35-47);

a plurality of data paths to selectively couple the I/O ports to the storage media (Napolitano, Col. 12, lines 35-47, the paths can be coupled to cache or physical disks),

Napolitano does not explicitly teach:

wherein a data path between one or more the storage media and the network connection is selected to provide sufficient data speed to accommodate the desired quality of service.

However, Galand teaches:

wherein a data path between one or more the storage media and the network connection is selected to provide sufficient data speed to accommodate the desired quality of service (Galand, [0094], [0102-0106]).

It would have been obvious to the person of ordinary skill in the art at the time of the invention to incorporate Galand teaching with of Napolitano because the combination would improve the efficiency of Napolitano's systems by utilizing a network topology based congestion control and path selection mechanism, (Galand, [0046-0049]; [0079]).

12. As per claim 30, Napolitano teaches a method substantially as claimed for allocating resources in a storage system, the storage system comprising an array of storage devices coupled to a network connection by data paths, the method comprising:

establishing a data path between a storage device of the array and the network connection (Napolitano, Fig 3, item 302);

Napolitano does not explicitly teach:

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the data path being selected to provide a sufficient data speed based upon data capacity of the storage device and data rate capability of the network connection; and

selecting a storage device of the array based upon the data capacity and the data rate capability of the network connection.

However, Galand teaches:

the data path being selected to provide a sufficient data speed (Galand, [0094], [0102-0106]) based upon data capacity of the storage device (Galand, [0158], [0160-0166], [0171-0172], wherein each intermediary nodes have their own data rate capability. In event of a network congestion as caused by unanticipated burstiness, said intermediary nodes will begin to drop packets. Since the origin node is reserving bandwidth/data rate capacity of the intermediary nodes, the node will either accept or reject such a request due to above mentioned finite data rate capability) and data rate capability of the network connection (Galand, [0105-0106]); and

selecting a storage device of the array based upon the data capacity and the data rate capability of the network connection (Galand, [0102-0106]).

It would have been obvious to the person of ordinary skill in the art at the time of the invention to incorporate Galand teaching with of Napolitano because the combination would improve the efficiency of Napolitano's systems by utilizing a network topology based congestion control and path selection mechanism, (Galand, [0046-0049]; [0079]).

13. As per claim 31, Napolitano - Galand disclose the invention substantially as rejected in claim 30 above, including:

establishing the data path comprises assigning a data path having a sufficient data speed to accommodate the desired quality of service (Galand, [0102-0106]).

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14. As per claim 32, Napolitano - Galand disclose the invention substantially as rejected in claim 30 above, including:

searching for unallocated data communications resources to accommodate a data capacity of the array (Galand, [0194-0196], wherein in event of a failure, new alternative route is selected to accommodate the failed data capacity).

15. As per claim 33, Napolitano - Galand disclose the invention substantially as rejected in claim 30 above, including:

searching for unallocated ones of the array having a sufficient data capacity to match a data rate capability of the network connection (Galand, [0102-0106]; [0158-0166]; [0171-0172]).

16. Claims 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Napolitano - Galand, in view of "Interface and bus glossary", Feature, October 31, 1997, further in view of "VIA IDE Miniport Driver", VIA IDE.

17. As per claim 26, Napolitano - Galand disclose the invention substantially as rejected in claim 23 above, but does not teach different operational characteristics comprise different speeds of operation. However, Napolitano - Galand suggested different drivers for various types of disks within the array (Napolitano, Col. 8, lines 10-17), it is well known in the art that SCSI and mini-port drivers operate at different speed, moreover, SCSI itself has multiple operation speed. Examiner's assertions are supported with Feature and VIA IDE articles. Refer first to VIA IDE, under "Software Publisher's Description From The Developer", this version of the mini-port driver supports ATA 100 and ATA 133 settings, two well known hard disk operating speeds; next, referring to Feature, SCSI standard comprises at least Fast SCSI (10MB/sec.), Ultra SCSI and Fast Wide SCSI (20MB/sec.), as well as Ultra Wide SCSI (40MB/sec.). Therefore, It would have been obvious to the person of ordinary skill in the art at the time

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of the invention to incorporate Feature and VIA IDE teachings with of Napolitano – Galand because the combination would improve the capabilities of Napolitano - Galand's systems by utilizing different disks with different access speeds (Feature, pg 1, SCSI definition; VIA IDE, pg 1, "Software Publisher's Description From The Developer").

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents and publications are cited to further show the state of the art with respect to "guaranteed Data Access Speed for a Storage System".


- i. US 6795865 Bahl et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chad Zhong whose telephone number is (571)272-3946. The examiner can normally be reached on M-F 7:15 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JAROENCHONWANIT, BUNJOB can be reached on (571)272-3913. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CZ
November 10, 2005


BUNJOB JAROENCHONWANIT
PRIMARY EXAMINER